



***ECO* puck user manual**

10/2014, Edition 3

User manual

Section 1 Specifications	3
1.1 Mechanical	3
1.1.1 Puck bulkhead connectors	3
1.2 Electrical	3
1.3 Communication	4
1.4 Optical	4
1.4.1 Single-parameter fluorometer	4
1.4.2 Single-parameter scattering	4
1.4.3 Two-parameter fluorometer-turbidity	4
1.4.4 Three-parameter fluorometer and scattering	4
Section 2 Operation and maintenance	5
2.1 Verify sensor operation	5
2.2 Set up puck for deployment	6
2.3 Save data	6
2.3.1 Save data to host PC	6
2.4 Sensor maintenance	7
Section 3 Reference topics	9
3.1 Delivered items	9
3.1.1 Test cable	9
3.2 Calibration	9
3.3 Characterization	9
3.4 Terminal program operation	9
3.4.1 Common terminal program operations	10
Section 4 General information	11
4.1 Warranty	11
4.2 Service and Support	11
4.3 Waste electrical and electronic equipment	11

Section 1 Specifications

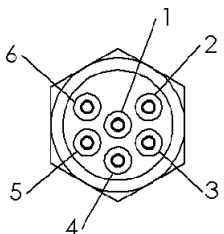
1.1 Mechanical

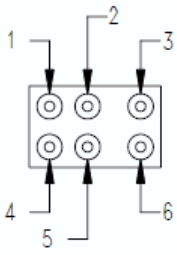
There are many different sizes of *ECO* pucks. The most common are specified below.

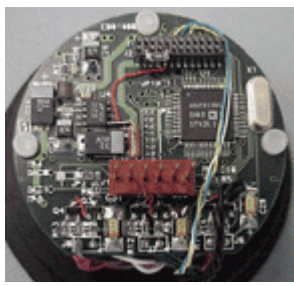
Diameter	Length	Depth rating	Temperature range	Weight in air, water
6.30 cm	5.683 cm	600 m	0–30 °C	0.235 kg, 0.235 kg
6.937 cm	5.147 cm			0.261 kg, 0.261 kg
7.62 cm	5.72 cm	600 m 1000 m		0.282 kg, 0.282 kg

1.1.1 Puck bulkhead connectors

ECO pucks use different bulkhead connectors. The most common are shown below.

Contact	Function	MCBH-6-MP
1	Ground	
2	RX	
3	Reserved	
4	Voltage in	
5	TX	
6	Reserved	

Contact	Function	LPMBH-6-MP
1	Ground	
2	RX	
3	Reserved	
4	Voltage in	
5	TX	
6	Reserved	

Pin	Function	Internal Molex connector
1	Reserved	
2	Voltage in	
3	TX	
4	RX	
5	Reserved	
6	Ground	

1.2 Electrical

Input	Current draw	Linearity
7–15 VDC	60 mA	99%

Specifications

1.3 Communication

Sample rate	Output rate	Output maximum	Output resolution
to 4 Hz	19200 baud	4130 \pm 30 counts	12 bit

1.4 Optical

1.4.1 Single-parameter fluorometer

Parameter	Wavelength EX/EM	Range, Sensitivity
Chlorophyll (Chl)	470/695 nm	0–125, 0.016 μ g/L
Colored Dissolved Organic Matter (CDOM)	370/460 nm	0–500, 0.093 ppb
Uranine (UR)	470/530 nm	0–400, 0.05 ppb
Phycocyanin (PC)	630/680 nm	0–230, 0.029 ppb
Phycoerythrin (PE)	540/570 nm	0–230, 0.029 ppb

1.4.2 Single-parameter scattering

Parameter	Wavelength	Range, Sensitivity
Scattering	470 nm, 532 nm, 650 nm	0–5, 0.003 m^{-1}
	700 nm	0–3, 0.002 m^{-1}
		0–5, 0.003 m^{-1}

1.4.3 Two-parameter fluorometer-turbidity

Parameter	Wavelength EX/EM	Range, Sensitivity (chl)	Parameter	Wavelength	Range, Sensitivity (NTU)
Chlorophyll	470/695 nm	0–30, 0.015 μ g/L 0–50, 0.025 μ g/L 0–75, 0.037 μ g/L 0–125, 0.062 μ g/L 0–250, 0.123 μ g/L	NTU	700 nm	0–10, 0.005 NTU 0–25, 0.013 NTU 0–200, 0.098 NTU 0–350, 0.172 NTU 0–1000, 0.123 NTU

1.4.4 Three-parameter fluorometer and scattering

Parameter	Wavelength EX/EM	Range, Sensitivity
Chlorophyll (Chl)	470/695 nm	0–30, 0.015 μ g/L
		0–50, 0.025 μ g/L
Colored Dissolved Organic Matter (CDOM)	370/460 nm	0–375, 0.184 ppb
Uranine (UR)	470/530 nm	0–300, 0.073 ppb
Phycocyanin (PC)	630/680 nm	0–175, 0.086 ppb
Phycoerythrin (PE)	540/570 nm	0–175, 0.086 ppb

Parameter	Wavelength	Range, Sensitivity
Scattering	412 nm, 470 nm, 532 nm, 650 nm, 880 nm	0–5, 0.003 m^{-1}
	700 nm	0–3, 0.002 m^{-1}
		0–5, 0.003 m^{-1}

Section 2 Operation and maintenance

2.1 Verify sensor operation

⚠ WARNING

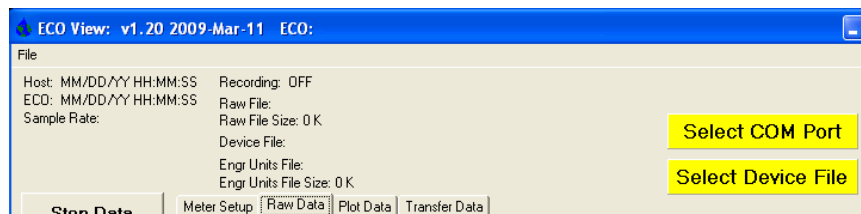
CDOM sensors use an ultraviolet LED light. Do not look directly at a UV LED when it is on. It can damage the eyes. Keep products that have UV LEDs away from children, pets, and other living organisms. Wear polycarbonate UV-resistant safety glasses to protect the eyes when a UV LED is on.

⚠ CAUTION

Do not supply more than 15 VDC to the sensor. More than 15 VDC will damage the sensor.

Make sure that the sensor operates before further setup and deployment.

1. Connect the 6-contact connector on the optional test cable (refer to the section on the [Test cable](#) on page 9 for details) to the sensor.
2. Remove the cap that protects the optical face of the sensor.
3. Connect a serial-to-USB adapter to the test cable to connect the test cable to the host PC.
4. Connect the sensor to a power supply.
 - a. Connect sensors with internal batteries to the manufacturer-supplied, three-contact, blue-tipped power connector.
The sensor comes on.
 - b. Connect sensors without internal batteries to the optional test cable and a regulated power supply set at 12 VDC.
5. Start the host software from the manufacturer-supplied CD.
 - a. Select the COM port on the host PC.
 - b. Select the device file for the sensor from the CD.
 - c. Select the baud rate if necessary. The default is 19200.



6. Turn on the power supply.
The sensor comes on.
7. Push **Start Data** on the host software.
8. Go to the *Raw Data* tab of the host software.
The data collected by the sensor shows in the "Signal" column.
Note that RT and puck sensors show 9's instead of the Date and the Time.

Figure 1 Format of data collected by real-time sensors

99/99/99	99:99:99	695	42	700	264	460	51	538
99/99/99	99:99:99	695	43	700	260	460	55	538
99/99/99	99:99:99	695	41	700	257	460	64	538
99/99/99	99:99:99	695	37	700	255	460	62	538
99/99/99	99:99:99	695	39	700	258	460	50	538
99/99/99	99:99:99	695	44	700	262	460	53	538
99/99/99	99:99:99	695	49	700	259	460	58	538
		Wave-length	Signal	Wave-length	Signal	Wave-length	Signal	Thermistor

9. Look at the maximum data value for the sensor. Hold a finger, the protective cap, or fluorescent stick if the sensor is a fluorometer, 1–4 cm away from the optical face of the sensor.
The data value in the "Signal" column in the *Raw Data* tab will increase toward the maximum data value specified for the sensor.
 - Scattering and turbidity sensors: use a finger or the protective cap.
 - CDOM sensors: use the blue fluorescent stick.
 - Chlorophyll or phycoerythrin sensors: use the orange fluorescent stick.
 - Uranine or phycocyanin sensors: use the yellow fluorescent stick.
 - PAR sensors: point the sensor into the light.
10. Push **Stop Data**.
The Bio-wiper closes on sensors so-equipped. If the power is turned off in mid-cycle, the Bio-wiper starts at the beginning of the cycle when power is supplied again.

2.2 Set up puck for deployment

1. Refer to the previous section to make sure that the sensor operates correctly.
2. Replace the test cable with a sea cable for deployment.
3. Remove the protective cap from the sensor if necessary.
4. Make sure that the sensor has a power source.

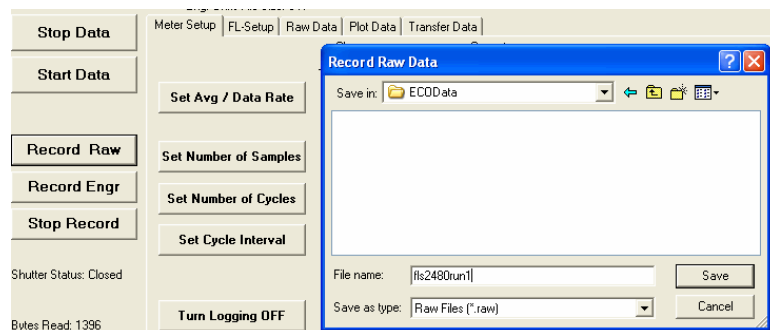
2.3 Save data

Save the data collected by the sensor in the sensor's memory (if so equipped), on the host PC, or both.

Note: *RT and puck sensors do not store data. Save the data from these sensors in real-time to the host PC or to a data logger.*

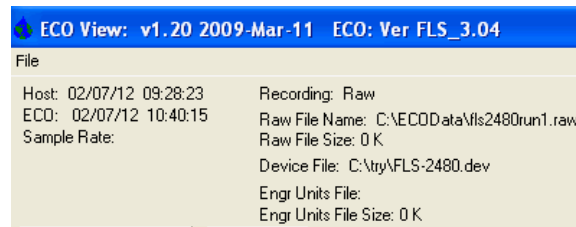
2.3.1 Save data to host PC

To save data to the host PC in counts, push **Record Raw**. To save data in engineering units, push **Record Engr**. Data collected by the sensor is saved in real-time to the host PC.



1. Push **Record Raw**.
The *Record Raw Data* window shows in the host software.
2. Select a location on the host PC to store the data.
3. Type a file name.
4. Push **Save**.
5. Push **Record Engr**.
The *Record Engineering Data* window shows in the host software.
6. Select a location on the host PC to store the data.
7. Type a file name.
8. Push **Save**.

9. Make sure the PC is configured to save data.
 - The file names from step 3 and step 7 will show in the host software.



10. Push **Start Data**.
The host software will show the host PC file sizes.

2.4 Sensor maintenance

⚠ CAUTION

Do not use acetone or other solvents to clean any part of the sensor.

1. After each cast or exposure to natural water, flush the sensor with clean fresh water.
2. Use soapy water to clean any grease or oil on the optical face of the sensor. It is made of ABS plastic and optical epoxy and can be damaged if an abrasive cleaner is used.
3. Dry the sensor with a clean soft cloth.

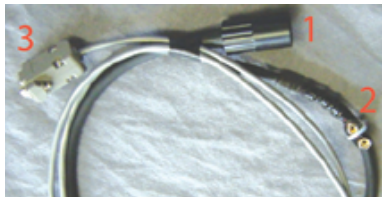
Section 3 Reference topics

3.1 Delivered items

- the *ECO* sensor
- a dummy connector and lock collar
- blue-tipped power connector and lock collar for sensors with internal batteries
- a plastic protective cover for the optical face
- a model-specific spare parts kit
- **On the CD:**
- this user manual
- the ECOView host software
- the device file or files for the sensor
- the characterization or calibration page for the sensor.

3.1.1 Test cable

Use a test cable to set up and test the sensor before deployment.



1 six-contact connector	3 db-9 serial port connector
2 9-volt battery connector	

1. Connect the six-contact connector into the sensor.
2. Connect the 9-volt connector to a 9-volt battery. As an alternative, it can be connected to a regulated power supply.
3. Connect the db-9 connector to the host PC. Use a USB-to-RS232 adapter cable if necessary.

3.2 Calibration

The manufacturer calibrates all scattering sensors to make sure that the data that is collected meets the sensor's specifications. This information is on the sensor-specific calibration page that comes with the sensor.

3.3 Characterization

The manufacturer uses a fluorescent material to characterize all fluorescence sensors to make sure that the data that is collected meets the sensor's specifications. This information is on the sensor-specific characterization page that comes with the sensor.

3.4 Terminal program operation

Use Windows HyperTerminal® or other terminal program to operate sensors as an alternative to the host software.

Interface settings				
baud rate: 19200	stop bits: 1	data bits: 8	flow control: none	parity: none

3.4.1 Common terminal program operations

Command	Parameters	Description
!!!!	none	Stops data collected by the sensor. Lets the user to enter setup values. If the sensor is in a low-power mode, turn the power supply off for one minute, then turn the power on and push the "!" key 5 or more times.
\$ave	1–65535	The number of measurements that make up each row of collected data.
\$mnu	—	Prints the menu of setup values to the host PC screen.
\$pkt	0–65535	Sets the number of rows of data that are collected between the specified time intervals.
\$run	—	Uses the current setup values to operate.
\$sto	—	Saves the desired setup values to the sensor's flash memory.

Section 4 General information

Revised editions of this user manual are on the manufacturer's website.

4.1 Warranty

This sensor is warranted against defects in materials and workmanship for one year from the date of purchase. The warranty is void if the manufacturer finds the sensor was abused or neglected beyond the normal wear and tear of deployment.

4.2 Service and Support

The manufacturer recommends that sensors be sent back to the factory annually to be cleaned, calibrated, and for standard maintenance.

Refer to the website for FAQs and technical notes, or contact the manufacturer for support at:

support@wetlabs.com

Do the steps below to send a sensor back to the manufacturer.

1. Contact the manufacturer for a Return Merchandise Authorization (RMA).
Note: *The manufacturer is not responsible for damage to the sensor during return shipment.*
2. Remove all anti-fouling treatment from the sensor before sending it back to the manufacturer.
Note: *The manufacturer will not accept sensors that have been treated with anti-fouling compounds for service or repair. This includes tri-butyl tin, marine anti-fouling paint, ablative coatings, etc.*
3. Use the sensor's original ruggedized shipping case to send the sensor back to the manufacturer.
4. Write the RMA number on the outside of the shipping case and on the packing list.
5. Use 3rd-day air to ship the sensor back to the manufacturer. Do not use ground shipping.
6. The manufacturer will supply all replacement parts and labor and pay to send the sensor back to the user via 3rd-day air shipping.

4.3 Waste electrical and electronic equipment



Electrical equipment that is marked with this symbol may not be disposed of in European public disposal systems. In conformity with EU Directive 2002/96/EC, European electrical equipment users must return old or end-of-life equipment to the manufacturer for disposal at no charge to the user. To recycle, please contact the manufacturer for instructions on how to return end-of-life equipment, manufacturer-supplied electrical accessories, and auxiliary items for proper disposal.

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